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A Conceptual Model of Profiling Foreign Students

Research-in-Progress

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Abstract

The proliferation of the foreign student's enrolment is projected at 7.2 million in the year 2025 from 1.8 million in 2000. Malaysian institutions are driven by foreign student's recruitment in line with Ministry of Higher Education vision of recruiting 200,000 foreign students by the year 2020. Although Malaysia emerging as one of top ten foreign students' recruiter, the knowledge of the extent of foreign students' intention to study in Malaysia is still modest. Yet, there is no precise profiling system that could infer whether these foreign students are genuinely coming into Malaysia for education purpose. To fill this study gap, we utilize the immense of information which available through the various types of social media, we adopt the user profiling method using social network analysis for the detection purpose of foreign students in Malaysian public universities.

Keywords: foreign students, user profiling, social network analysis, theory of planned behavior, social cognitive theory

Introduction

Higher education or sometimes denoted as tertiary education is been sought after by students around the world who seeks in acquiring knowledge. The proliferation of the foreign student's enrolment is projected at 7.2 million in the year 2025 from 1.8 million in 2000 (Bohm et al. 2002). It also forecasted that China and India will dominate the 70% of total global demand by 2025 (Bohm et al. 2002; Hawthorne 2008) and other countries in Asia, Malaysia and Singapore also been listed as an emerging competitor (Hawthorne 2008). For example, students from the developing countries had been eyeing the Southeast Asian universities for attaining higher degrees; Master and Ph.D.'s (Umar et al. 2014).

Malaysia is striving towards establishing itself as a regional education hub by 2020 through research and development programme was outlined in the 9th Malaysian Plan (2006-2010) (Cheng et al. 2013; Knight and Morshidi 2011). It all began when Ministry of Higher Education (MOHE) launched of The National Higher Education Strategic Plan 2020 (NHESP) in August 2007 with the notion of reforming the nation's higher education. The implementation is divided into four phases to represent the nation's higher education transformation whereby the second phase was launched in June 2011 emphasizing on the higher education delivery which outlined the seven key initiatives as listed below (Cheng et al. 2013; Knight and Morshidi 2011):

- Phase 1 (2007 - 2010) : Laying the Foundation

- Phase 2 (2011 – 2015) : Strengthening and Enhancement
 1. Widening access and increasing equity
 2. Improving quality of teaching and learning
 3. Enhancing research and innovation
 4. Strengthening higher education institutions
 5. Intensifying internationalisation
 6. Enculturation of lifelong learning
 7. Reinforcing the delivery system of MOHE
- Phase 3 (2016 - 2020) : Excellence
- Phase 4 (Beyond 2020) : Glory and Sustainability

The fifth initiative-intensifying internationalization from the Phase 2 (2011-2015) seeks interest in developing Malaysia as an education hub in the region. It is also comprised MOHE's aspiration of recruiting 200,000 foreign students and to be listed as one of the top six countries choices for the foreign students by the year 2020 (Lewis 2016; Shahijan et al. 2016).

In mid-1997, the Asian financial crisis has triggered economic chaos in most of South East Asia countries which saw a tremendous effect on rate exchange, share market, banking sector and international trade system (Radelet and Sachs 1998). The financial crisis may deteriorate the economy but it was a contradictory implication in education especially higher education (Asari et al. 2017) as it encouraged potential foreign students to pursue higher education in Malaysia due to the affordable fees compared to other countries like USA and UK (Tan 2002).

Malaysia is known for its diverse culture despite being an Islamic country, also has attracted students not only from Arab, Africa but also from Asia, for example, Pakistan and Indonesia (Pandian et al. 2016). Middle East country student's encountered difficulties in pursuing the education in the USA after the 9/11 attack forcing the students to seek more practical and affordable options (Abd Aziz and Abdullah 2014; Sirat 2008).

Drawing from this, MOHE launched Education Malaysia Global Services (EGMS) in 2013 to streamline and to reduce the bureaucracy dilemma whereby each foreign student applications will go through the academic screening process before being forwarded to the Immigration Department for the Visa Approval Letter (VAL) (Keong et al. 2014; StudyMalaysia.com 2017). The EGMS establishment is crucial as it could minimize the last minute approvals which affected the foreign student admissions by 15% (Keong et al. 2014). It is also motivated by the establishment of foreign universities and private college's branch campuses in Malaysia (Abd Aziz and Abdullah 2014; Knight and Morshidi 2011; Tham 2013). It is indisputable that Malaysia has emerged as an attractive education destination to the foreign students due to its affordable tuition fees, usage of English as instruction medium, lower cost of living and also home to multi-ethnic diversity (Manjula and Slethaug 2011).

The proliferation of foreign students enrolments also corresponded to some hitches among the foreign students in Malaysia such as visa and drug misuse and anti-social activities despite going through a stringent process before approval being issued to a foreign student (Umar et al. 2014). Some of these dubious foreign students are not listed in the suspect record, therefore making it impossible to identify and distinguish them as genuine foreign students or not. The rising concern over terrorism may taint the nation's image in the eye of the world, therefore the authorities ought to take a pro-active action to overcome the student visa abuse by the dubious party. Some of the challenges in the current procedure to distinguish the dubious foreign students:

- information is merely provided by the students;
- one time screening process – during the application stage;
- some of these students are not recorded in the suspect list;
- human behaviors may change at any time under some circumstances;
- no continuation scrutiny involved after the admission at the institution

Therefore, this study is intended to seek an answer of how to identify and distinguish the potential foreign student's right from the beginning of their application. Our main aim is to propose a system to overcome these problems; profiling the foreign students by exploiting the abundance data available in social media. The social media could provide some information from a different point of view. Some of the descriptions that social media could provide are:

- there is no manifestation of social media;
- some of the online content that found to be offensive/notorious/confrontational;
- the associations with professional or confrontational groups

Being said that, profiling could be a guidance by connecting the behavior pattern to the individual characteristics. This profiling system could be an added value along with the current conventional approaches. It not only can be employed prior to their admission but also after the admission, as the authorities could conduct scrutiny periodically or at any point if any issues raised involving the foreign students in the country.

Theoretical Background

Quintessentially the role of Information and Communications Technology (ICT) was effortless in those days. But now, the ICT growth is inevitable and subsequently become one of the necessities for individuals by changing the norm in how people communicate around the world. Apparently, the ICT evolution results towards the explosion of information as people prefer establishing their identity through a number of online social networks or merely known as 'user profile'.

User Profile

A user profile may look trivial but it contains a short description of a person virtually where others might find it as important. User profile refers to the description of individuals' social characteristics namely users and their connections used to identify them on social media sites (Oinas-Kukkonen et al. 2010). Users profiles are customized based on their preferences which consist some of the mutual information like birthday date, relationship status, hometown and email address (Barbier and Liu 2011). Additionally, these social patterns also could be used to infer some general user activity patterns, network access patterns on social media platforms which can be divided into two types of behavior; (i) persistent behavior: directly gauged from the publicly available data such as individual's network structure and individual's created content; and (2) non-persistent behavior: indirectly gauged by the hidden data such as log history, social behavior (Das and Sinha 2016).

Being such, users are not grasped by the idea that their data such as profile data, posted data, derived data (Das and Sinha 2016) are being used and processed for numerous purposes such as marketing, advertisement, sentiment analysis and profiling. User profiling has been utilized in various areas such as services (Kanoje et al. 2015), transport (Roy et al. 2012), obesity prevention (Marks et al. 2013), security (Al Hamid et al. 2017; Cufoglu 2014) and customer relationship management (van Dam and van de Velden 2015).

Social Network Analysis

The fundamental of social networks are the users and their connections that represents the structure of a network (Ghafoor and Niazi 2016; Oinas-Kukkonen et al. 2010). Social Network Analysis (SNA) is a mathematical presentation consisting these network structure. Based on graph network theory, SNA investigates the social structure; mathematically or graphically gauged to represents the connection patterns (edges/links) by the nodes (users) that can be assessed to infer the most influential figures or leaders within a network (Lee 2017; Waniek et al. 2017). SNA is being used to disclose the primary users in the network, besides aids to populate the attributes of the social, environmental and individual characteristic deriving from the user profile (Hasan et al. 2013). Thus, SNA measures emphasize on the social relationship between the users rather than using the user's attributes. The idea of SNA has been

rising and it has been used extensively in various areas such as global crime and terrorism (Krebs 2002; Medina 2014), DNA forensic (Jeuniaux et al. 2016) and human behavior (Ghafoor and Niazi 2016).

Social media such as Facebook, Twitter, YouTube and Flickr not only being used for networking, photo and video sharing purposes but also been exploited for marketing products or promotions. Facebook is been used to identify the most active and influential users and also could identify users who have positive and negative influence in the group via sentiment analysis (Nouh and Nurse 2015). The profiling of the social data can be done through the historical Internet activity data, views, link clicks, and searches by the individual which means it could extract any number of characteristics about that particular individuals. For example, the foreign students in American universities rely on Facebook for acquiring information (Sin and Kim 2013). Meanwhile, the 'Like' history on Facebook can use to infer traits and attributes (Kosinski et al. 2013). In short, by profiling an individual, we may collect information about the user which contains various features about them.

Centrality Measures

A social network consists of a set of *nodes* V , denotes an individual or the origin of a communication and a set of *edges* E , denotes the level of communication between the nodes which can be presented as $N = (V, E)$. The centrality measures are intended for one node and the centralization can help to identify the most influential and dominant nodes in a network (Ghafoor and Niazi 2016). These well-known structural centrality measures are adapted from (Bonacich 1972; Freeman 1978) as listed below:

- Degree centrality - indicates the number of ties in a network and usually analyzed by the in and out degree. In degree represent the incoming links towards the node whereas the out degree represents the outgoing links from the node.
- Closeness centrality - indicates how easily a node can make ties and a node is considered as central of a network when having a low closeness centrality.
- Betweenness centrality - indicates the shortest path between nodes and a node is considered to be high betweenness centrality when a node provides the shortest path among the nodes.
- Eigenvector centrality - reflects on the node's influence within a network and is used to find the most influential node in a network (Ghafoor and Niazi 2016).

Theory of Planned Behavior

Theory of Reasoned Action (TRA) extension results in Theory of Planned Behavior (TPB) to explain the individual's intention to involve in a behavior at a particular time and place. The TPB extricates the three belief's components; behavioral, normative and control which intended to explain the individual's behavior act are based on the intention comprises of six elements as a representation of an individual's actual control of a behavior (Ajzen 1985).

Social Cognitive Theory

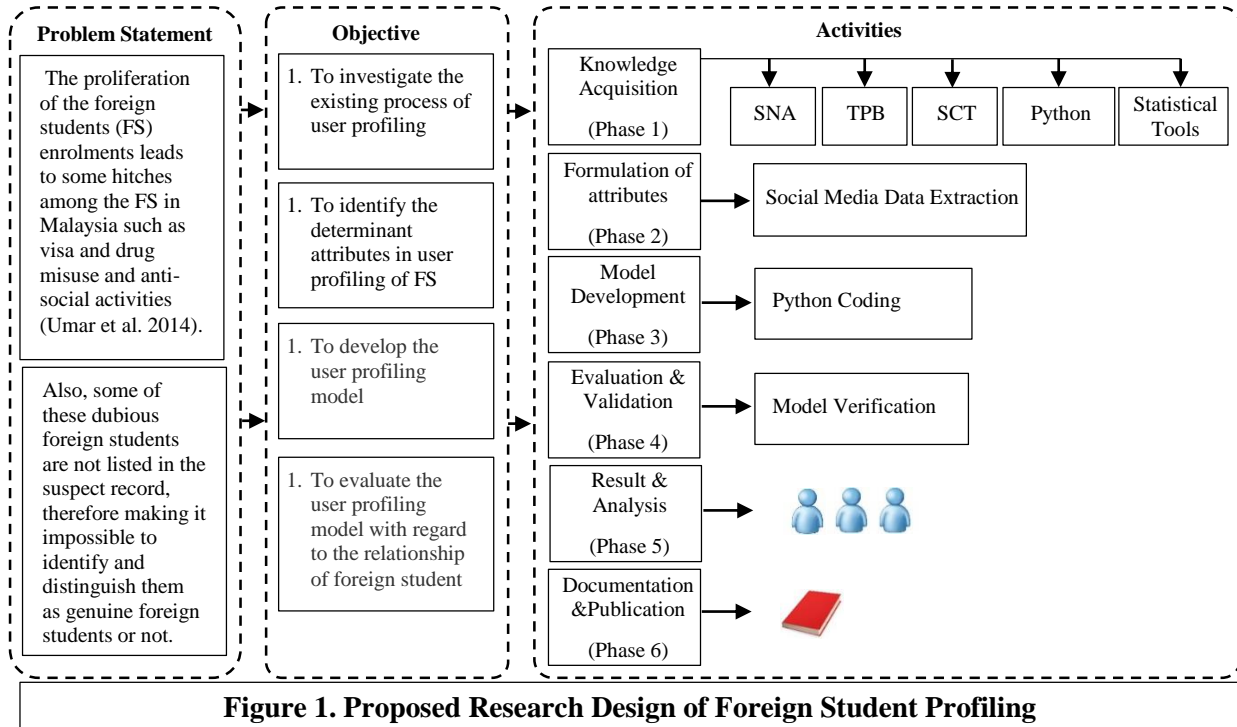
Social Cognitive Theory (SCT) origins from Social Learning Theory in the 1960s (Bandura 2001). SCT proposes the learning in social context occurs with both common and dynamic interaction among individual, environment and behavior. It explains an individual may acquire and preserve behavior in a unique way with the influence of their thoughts and actions. These behaviors are determined by the environment which affects their behavior. The relation between the individual and environment are determined by the belief and cognitive aspect by taking into account the social environment to perform the behavior. SCT explains how an individual may maintain their behavior over time through control and reinforcement (Bandura 2001).

Research Design and Methodology

This research attempts to halt the incoming foreign student for diverse purposes by profiling and to understand the background of these foreign students. Drawing from this, the research questions for this study are as follows:

- What is the existing process of user profiling?
- What are the determinant attributes in user profiling of foreign students?
- How can the user profiling of foreign students assist the authorities in decision-making?

Figure 1 depicts the proposed research design consists of problem statement, objectives and the related activities.



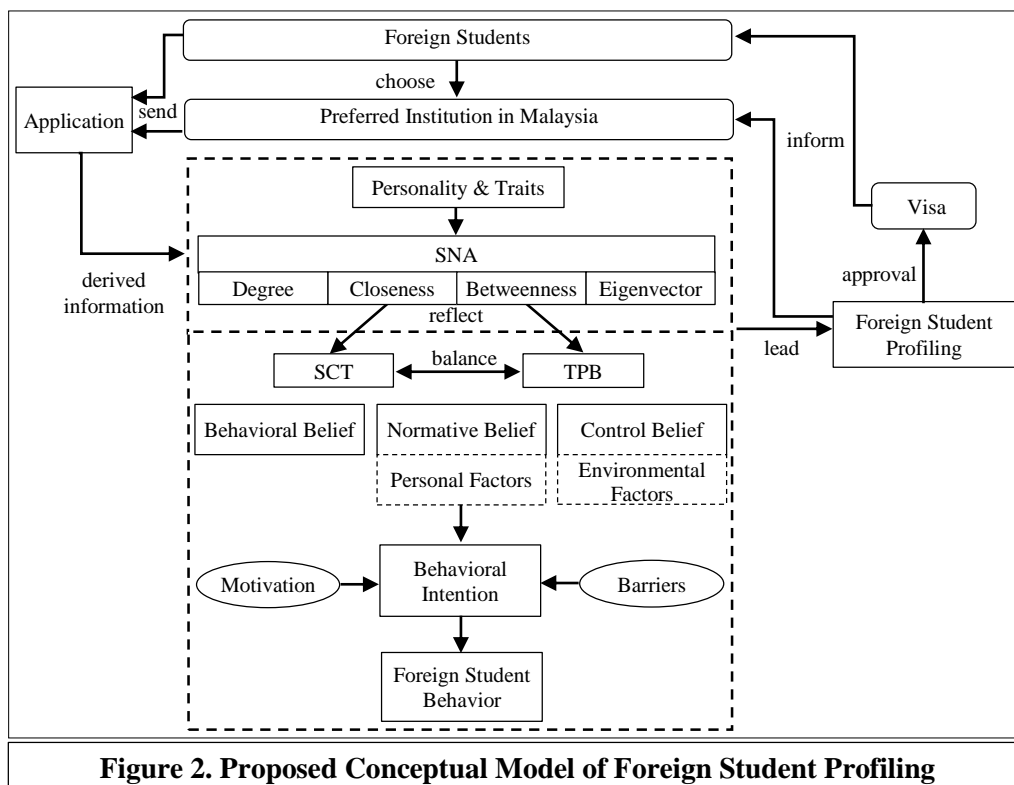
This study involves modelling the foreign student profiling system align with the NHESP by MOHE big data era. Phase 1 pursues the knowledge acquisition about the related theories which will outline and underline the existing user profiling procedure in regard to the profiling of foreign students in Malaysia. Grounded from the outcome of phase 1, it will support in identifying the determinant attributes of user profiling in phase 2. This activity will be carried out by exploiting the identified theories, SNA, TPB and SCT. The model developed in phase 3 will be centered on the identified attributes using Python programming. The data extraction also will be carried out using the social media API. These data will be analyzed further to eliminate the inappropriate, incomplete and redundant data. The profiling model will be evaluated and validated to ensure the model verification in phase 4. In phase 5, the result will further be analyzed using the SNA, TPB and SCT in profiling the foreign students. Phase 6 is about the documentation and publication practice of the developed foreign student profiling model for future reference.

Model Development

The foreign students' features will serve as a basis for the conceptual model of the foreign student profiling. The features extracted will include their personal traits, demographic information and also the social aspects. Then, these components will be applied to SNA using the said centrality measures. Then, TPB elements such as i) normative belief and subjective norms - reflects on the individual's perception in performing a behavior; ii) control beliefs and perceived behavioral control – reflects on the factors that facilitate or hinders in performing a behavior and also about the individual's level of difficulty in performing a behavior; iii) behavioral intention and behavior reflects on the individual's readiness of performing a behavior which based on the attitude, subjective norm and perceived behavioral control, as well as the individual's reaction towards the behavior will be applied.

In contrast, SCT is built on learning theory which indicates individual learn through observation. The influence development in the mutual relationship is based on the environment, behavior and cognitive aspect as primary factors. The behavior is influenced by the three main elements (Bandura 2001); the personal entity identifies the level of self-efficacy of an individual; the behavioral entity identifies the feedback received after an individual perform a behavior and the environmental entity identifies if the environment's condition could influence individual's ability to perform a behavior. The TPB and SCT will be mapped together based on the moderating aspects; motivation and barriers to determine the foreign students behavioral in addition to their personal traits. Social network analysis, theory of planned behavior and social cognitive theory guided the development of the research model to draw a better inference of the foreign student's profiling.

In a nutshell, the essential information from the foreign student's application will be extracted before the SNA, SCT and TPB applied to disseminate their unique profile. From here, the authorities could decide the approval of these foreign student's application as well as their visa application. This proposed model not only could be employed during their application submission, but it could be used at any point of time throughout their study term in Malaysia. The proposed conceptual model of foreign student profiling is depicted in Figure 2 below.



Discussion & Conclusion

This research work is intended to identify and distinguish the potential foreign student's right from their application. Even though the EGMS conduct a stringent process towards every application before approval being issued to a foreign student, there is still some room for student visa misuse. It is motivated by the current procedure's drawback as the information is merely provided by the students and go through a one-time screening process. Besides that, there is no continuation of scrutiny involved towards these foreign students after the admission in their institution respectively. Therefore, this study aimed to overcome these problems by profiling these foreign students using the richness of data available in social media. Apart from that, it is expected to help the relevant authorities to monitor and conduct the scrutiny periodically or at any point, if any issues raised involving the foreign students in the country. Moreover, it is also could assist the authority to improve their services by making real-time decision-making.

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